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DIVISION OF WASTE MANAGEMENT
HAZARDOUS WASTE SECTION

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Technical Memorandum on Groundwater Flow from Arcadis (Dave Wilderman) for Ashland dated June 23, 2017

Author: Dave Wilderman

Branch/Unit: Facilities Management Branch

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Facility/Site City: Greensboro

Facility/Site State: North Carolina

Facility/Site Zipcode: 27407

Facility/Site County: Guilford

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TECHNICAL MEMORANDUM

To:

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(NCDEQ)

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From:

David Wilderman

Date:

June 23, 2016

Arcadis Project No.:

OH010000.NC10

Subject:

Groundwater Flow in Proximity to the MW-29 Well Cluster
2802 Patterson Street, Greensboro, NC

This Technical Memorandum (TM) is prepared in response to Comment #3 of Mr. Michael Babuin's letter to Arcadis dated May 27, 2017. That comment requested that additional investigation of existing data be performed to develop a better understanding of groundwater flow characteristics in the deeper portions of the shallow aquifer downgradient of the former Ashland site in proximity to the MW-29 well cluster. Specifically, the comment requested that data be provided to the NCDEQ that would be "useful in helping to ascertain whether lower elevation groundwater molecules are discharging to a known hydraulic terminus, or are under control in another manner."

The MW-29 well cluster is located in the distal portion of the groundwater plume as shown on the attached Figure 3-3 from the October 2014 Corrective Measures Study. There are no well clusters farther down gradient where vertical gradients can be evaluated.

Arcadis has reviewed available MW-29 well cluster data including: hydraulic testing records, water level measurements, boring logs, well construction logs, and laboratory groundwater sample data reports in the preparation of this TM. A summary of the relevant conclusions that can be reached to respond to NCDEQ's comment is provided herein.

Boring Log and Well Construction Data Summary

Three groundwater monitoring wells comprise the wells in the MW-29 cluster and include MW-29S (screened from 3.25 to 8.25 feet below ground surface- bgs), MW-29D (screened from 10.5 to 20.5 feet bgs) and MW-29BR (screened from 80 to 90 feet bgs). Well construction logs for these wells are provided in Attachment A. The lithologic and geophysical logs for these wells were also reviewed to evaluate the

potential hydrogeologic connections between the screened zones and lithologic logs for MW-29D and MW-29BR are also provided in Attachment A. The review of these data suggests that the screened zones of the two shallower wells may be in hydraulic connection as there may be less than one foot of low permeability material separation between the screened zones. The screened zones between MW-29D and MW-29BR are however separated vertically by approximately 60 feet and hydraulic connections between those two well screens are unlikely based on the description of the types of geologic strata described in the lithologic and geophysical logs.

Water Level Measurement Data Summary

Arcadis reviewed available well gauging data and historical vertical gradient calculations and has concluded that the data confirm a downward gradient exists between the shallower two wells in the cluster (MW-29S and MW-29D) and the bedrock well MW-29BR. The graph shown in Attachment B illustrates the -0.02 to -0.03 average gradients for these well pairs.

Historical Laboratory Data Summary

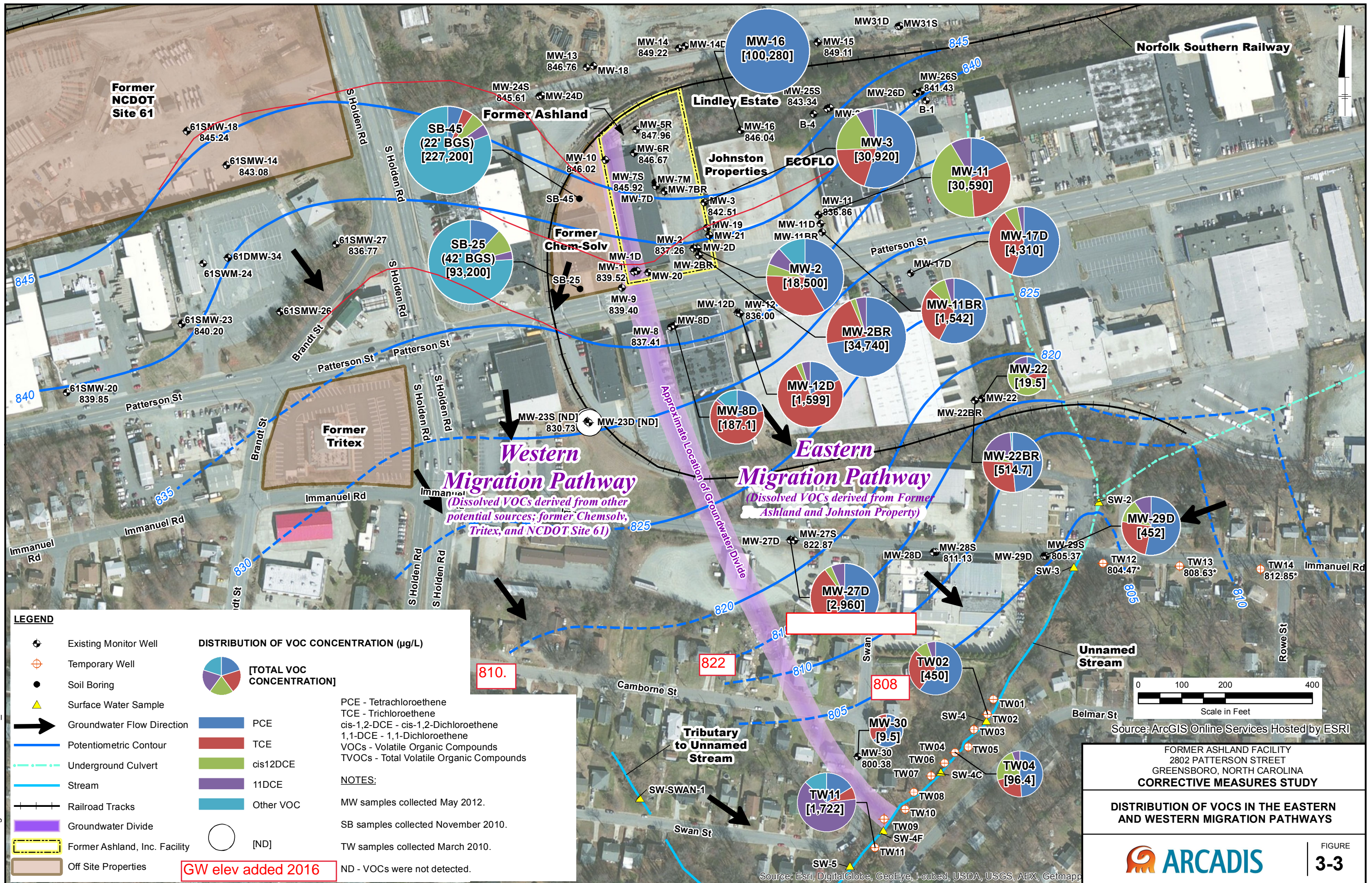
Historical laboratory reports of groundwater samples collected from well in the MW-29 cluster are summarized in Attachment C. A review of these trends indicates concentrations of target analytes in MW-29S are stable over the 2011 to 2015 monitoring period. General trends observed in the data records from the two deeper wells indicate generally stable trends in volatile organic compound (VOC) concentrations with exception of the 2016 results which show an increase in VOC concentrations. Further data collection is needed to assess the importance of the most recent data on long term trends.

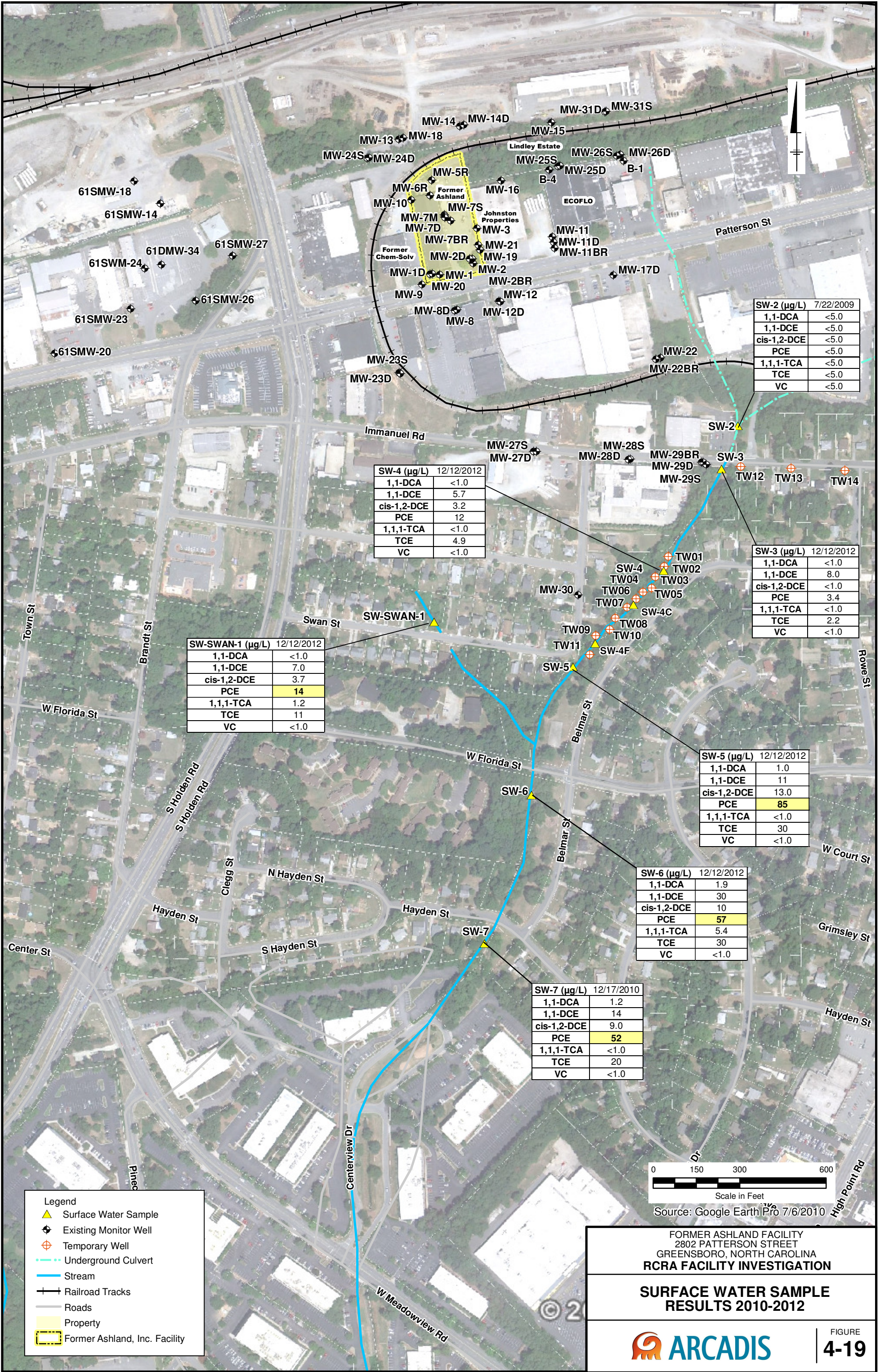
Concentrations of VOCs in surface water samples collected from the unnamed creek were also reviewed as part of this evaluation. The Human Health Risk Assessment and Ecological Risk Assessment submitted to the NCDEQ in June 2011 concluded that: (1) no adverse health effects due to constituents in the surface to a wader in the unnamed stream were expected and (2) no adverse ecological effects due to constituents in surface water were expected. Figure 4-19 from the September 2013 RFI (attached) illustrates the concentrations of VOCs in surface water samples and shows generally low-level and consistent VOC concentrations of the reach of the stream that intersects Ashland's portion of the groundwater plume (i.e., SW-2, SW-3, and SW-4). The VOC concentrations at sampling locations farther downstream (SW-5, SW-6, and SW-7) show increased VOC concentrations indicating their connection with Western Migration Pathway illustrated on Figure 3-3.

Summary and Conclusion

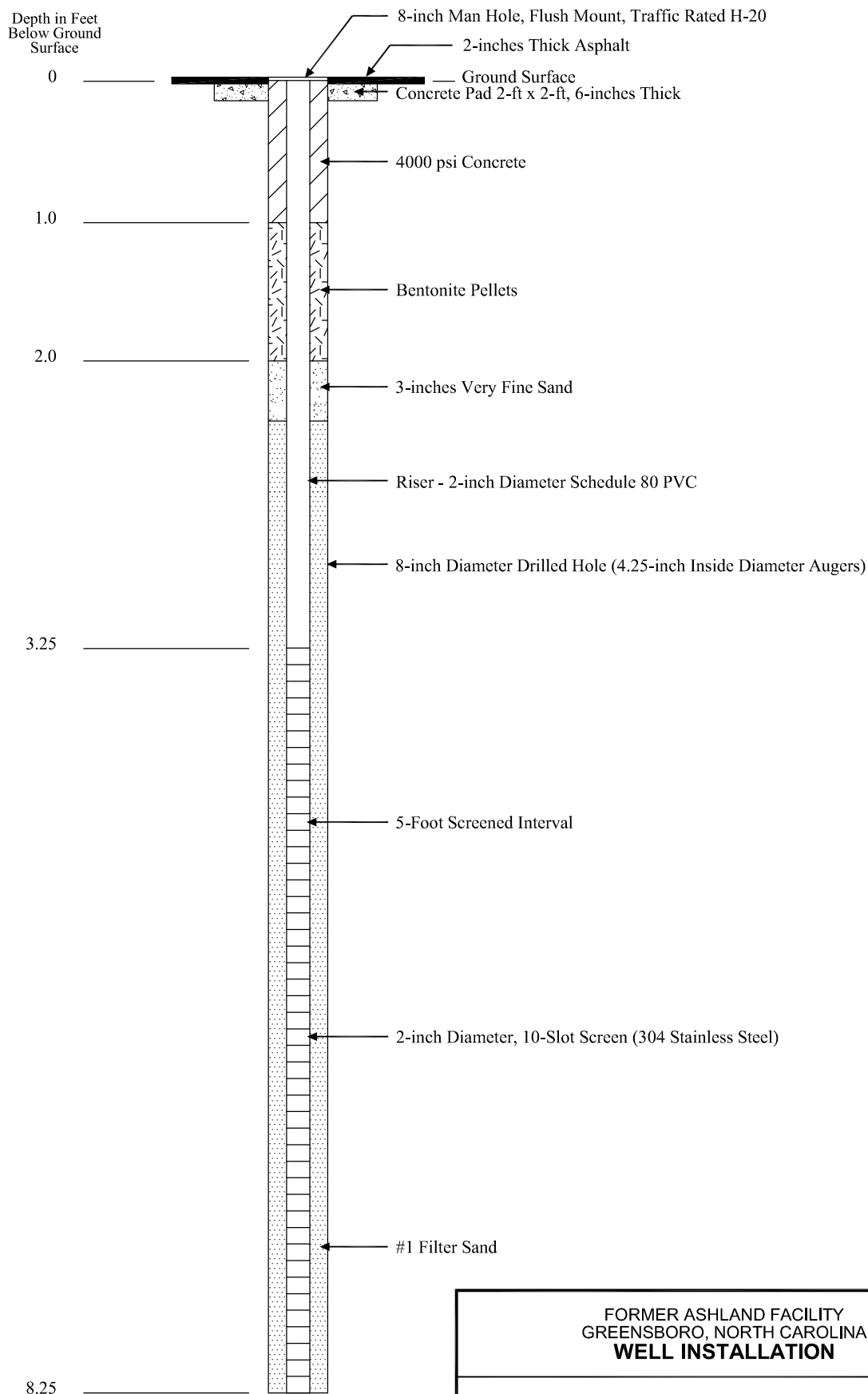
Limited vertical gradient data is available at the distal end of the groundwater plume associated with the former Ashland site. Some laboratory results evaluated in this TM indicate that VOC trends may be increasing in the most recent years of the monitoring program. However, the data suggest that the groundwater plume in proximity of the MW-29 cluster exists in a fairly steady-state condition and additional data are needed to confirm VOC concentration trends over a longer period. The influence on the groundwater plume by the unnamed stream is evident by the upward hydraulic gradient shown between the two shallower wells of the MW-29 cluster and that upward vertical influence to this gaining stream forms a discharge boundary that is expected to continue farther downstream.

CITY: Augusta, GA DIV/GROUP: ENV DB: A. Saul LD: PIC: PM:D. Malone TM: R. Gerber TR:
Thursday, December 16, 2010 2:02:34 PM
G:\ENVCAD\Augusta-GA\ACTOHO04000_Ashland\NC0411304\Pie Charts for VOCs.mxd





CITY: AUGUSTA, GA DIV/GROUP: ENV/CAD DB: A. SAUL LD: A. SAUL PIC: (Opt) PM: (Reqd) TM: M. WEBB LVR: (Opt) ON: OFF=REF
 C:\ENV\CAD\Augusta-GA\ACT\01005000\ING0512305\SH-WCD.dwg LAYOUT: MW-29S SAVED: 1/23/2012 8:38 PM ACADVER: 16.1.5 (LMS TECH) PAGES: 1 OF 1 PLOT: 1/23/2012 8:38 PM BY: ASAIL
 PROJECTNAME: ---



NOT TO SCALE

LEGEND

psi = pounds per square inch

FORMER ASHLAND FACILITY
 GREENSBORO, NORTH CAROLINA
WELL INSTALLATION

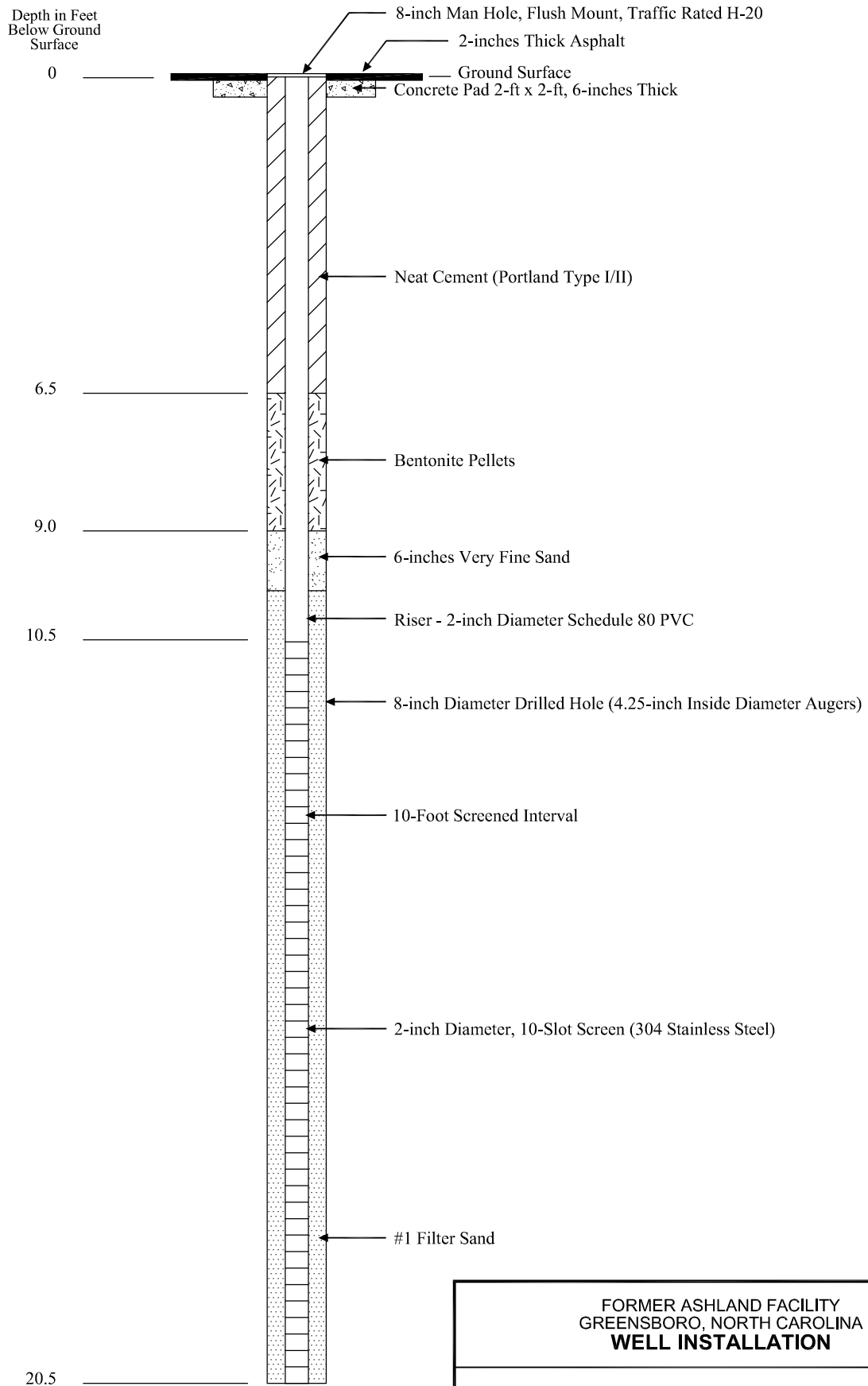
**MW-29S
 CONSTRUCTION DETAIL**



FIGURE

■

ATTACHMENT A



NOT TO SCALE

LEGEND

psi = pounds per square inch

FORMER ASHLAND FACILITY
GREENSBORO, NORTH CAROLINA
WELL INSTALLATION

**MW-29D
CONSTRUCTION DETAIL**



FIGURE

■



MW-29BR
CONSTRUCTION DETAIL
JUNE 15, 2012





SOIL CORE / SAMPLING LOG

Boring/Well	MW-29D	Project/No.	OH004000.NC04.11302	Page	1	of	1
Site Location	Greensboro, North Carolina	Drilling Started	3/31/2011	Drilling Completed	3/31/2011		
Drilling Contractor	Parrott-Wolff	Driller	Josh Ellingworth	Helper			
Drilling Fluid Used	None	Drilling Method	CME-55 Hollow-stem-auger				
Length and Diameter of Coring Device	4 feet x 3 inches	Sampling Interval	Continuous	feet			
Land-Surface Elev.	811.4 feet	<input checked="" type="checkbox"/> Surveyed <input type="checkbox"/> Estimated	Datum	Land Surface			
Total Depth Drilled	20.3 Feet	Hole Diameter	8.3	Coring Device	Macro-core		
Prepared By	Mathew Webb	Hammer Weight	140 lbs	Hammer Drop	30	ins.	

Sampling Data:

Depth	Grab/Composite	Time	Laboratory Analysis

Soil Characterization:

Sample/Core Depth (Feet bls)		Core Recovery (Feet)	OVM Reading (ppm)	Blow Counts per 6 Inches	Sample/Core Description
From	To				
0.0	1.0	NA			0.0-1.0: 6 inches of asphalt, 6 inches of aggregate base
1.0	2.0				1.0-5.0: Silt/clay (60%) and fine sand, well sorted, soft, moist, yellowish red
2.0	3.0				(5YR 5/8). Some parent textures present, saprolite.
3.0	4.0				
4.0	5.0				
5.0	6.0	4.0	0.1	4, 11	5.0-7.0: Same as 1-5
6.0	7.0		0.2	28, 46	
7.0	8.0		0.1	40, 32	7.0-9.0: Fine sand (70%) with some silt/clay, well sorted, medium stiffness, moist,
8.0	9.0		0.2	36, 29	olive yellow (2.5Y 6/6) mottled with reddish yellow (7.5YR 7/8).
9.0	10.0	3.0	0.6	20, 38	9.0-11.0: Same as 7-9
10.0	11.0		0.5	32, 18	6 inches of coarse, poorly graded sand and gravel at 9.5 ft
11.0	12.0		0.6	50/5	11.0-12.0: Fine to coarse sand (80%) with little silt/clay, poorly sorted, angular,
12.0	13.0	0.0			moist, soft, yellowish red (10YR 5/6) mottled with dark yellowish brown (10YR 3/6)
13.0	14.0		0.5	50/4	
14.0	15.0				
15.0	16.0	0.0	0.5	50/3	15.0-15.5: Same as 11-12
16.0	17.0				
17.0	18.0				
18.0	19.0				
19.0	20.0				
20.0	21.0	0.1		50/1	20.0-20.1: Granitic rock fragments
21.0	22.0				Bottom of boring at 20.3 feet
22.0	23.0				
23.0	24.0				
24.0	25.0				
25.0	26.0				



Borehole and Well Construction Log

Page 1 of 4

Well ID MW-29BR

Greensboro, NC

Project Ashland Greensboro
Project No. OH005000.NC05.12308
Site Location Greensboro, North Carolina

Contractor/Driller Parratt-Wolff
Rig Type CME-55
Method Hollow-stem auger, air-rotary, wireline

Total Depth Drilled 90 ft
Sample Method/Size 5 ft core barrell
Cutting Disposal 55-gallon drums

Well Construction Log	Depth (ft)	Spl Run	Lab Samples	Borehole Log Description	Ft. Rec.	Blow Count	PTD (ppm)
<div><div>Date/Time Begin: 6/13/2012; 8:00 End: 8/1/2012; 12:00</div><div>Construction</div><div>Intervals (ft BGS) Riser: 0-80 Screen: 80-90 Surf. Seal: 0-75 Seal: 75-78 Filter Pack: 78-90 Backfill: NA</div><div>Materials Riser: 2" Sch 80 PVC Screen: 2"x10' wire wrapped stain- less steel Surf. Seal: Type I/II neat Portland cement Seal: Coated bentonite pellets Filter Pack: #1 Filter Sand Backfill: NA</div><div>Surface Completion Protection: 8" flush-mounted manhole cover Pad: 2' diameter x 1' thick 3000 PSI concrete Lock: Aluminum padlock</div><div>ARCADIS G&M Personnel Field Work: Mathew Webb Log Draft: Mathew Webb</div><div>Symbols Grout: Bentonite: Sand: Sampled Interval: </div></div>	0			MW-29BR (cont'd) 0.0-5.0 ft: 3 inches of asphalt, 6 inches aggregate base. 0-5.0 ft advanced using a hand auger			
	1						
	2						
	3						
	4						
	5			5.0-19.0 ft: Advanced with 10-inch outside diameter (OD) hollow-stem auger (HSA)			
	6			See MW-29D for lithologic descriptions			
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19			19.0 ft: HSA refusal, 6-inch casing installed and cemented into place with neat			
	20			Portland Cement			
	21						
	22						
	23			22.5-26.2 ft: Weathered BIOTITE GNEISS, moderately hard, moderately severe weathering, gray and	0.8		
	24			white with reddish brown staining on fracture surfaces, bands of fine and coarsed grained mineral			
	25			textures with preferred mineral orientation approximately 60 degrees from horizontal rough joint			
				surfaces, thin to very thin foliations, extremely fractured.			

Borehole and Well Construction Log

Well ID MW-29BR

Project: Ashland Greensboro

Project #: OH005000.NC05.12308

Well Construction Log		Depth (ft)	Sp/Run	Lab Samples	Borehole Log Description	Fl. Rec.	Blow Count	PID (ppm)
Boring Dia. < -- > v		25			MW-29BR (cont'd)			
		26			26.2-26.7 ft: Weathered BIOTITE GNEISS, same as above	0.5		
		27			26.7-28.7 ft: Weathered BIOTITE GNEISS, 1-2-inch layer of light colored, coarse grained minerals. RQD=0.30	2.0		
		28				5.0		
		29			28.7-33.7 ft: Weathered BIOTITE GNEISS and/or GRANITE, medium hardness, moderately severe weathering, fine grained, primarily gray and white in color with red/brown staining on rough surfaces, joint no apparent foliation, close high angle fractures. RQD = 0.17			
		30						
		31						
		32						
		33						
		34			33.7-38.7 ft: Weathered BIOTITE GNEISS and/or GRANITE (see above) transitions into GRANITE (quartz-feldspar pegmatite), hard, slight weathering, white (90%) coarse to very coarse grained quartz and feldspar with medium grained darker mineral crystals, jointed with rough, closely spaced fractures, subvertically oriented foliations. RQD=0.0	2.0		
		35						
		36						
		37						
		38				1.0		
		39			38.7-43.7 ft: Weathered GRANITE (as described above) transitions to GRANITE-DIORITE (medium hardness, slight weathering, white, green, and black, medium grained). RQD=0.0			
		40			Harder material is more readily recovered, recovered sections may not be entirely representative of subsurface lithology.			
		41						
		42						
		43						
		44			43.7-48.7 ft: (Top 2 ft) Weathered DIORITE, moderately hard, moderate weathering, black and white, coarse grained, jointed, rough, closely spaced, high-angle fractures	3.5		
		45			(Bottom 1.5 ft) Weathered GRANITE, very hard, fresh, white coarse grained, jointed, rough, closely spaced fractures. RQD=0.17			
		46						
		47						
		48						
		49			48.7-53.7 ft: Weathered GRANITE, same as above, extremely fractured, mostly coarse gravel. RQD=0.0	3.0		
		50						

Borehole and Well Construction Log

Well ID MW-29BR

Project: Ashland Greensboro

Project #: OH005000.NC05.12308

Well Construction Log		Borehole Log			Ft. Rec.	Blow Count	PID (ppm)
Depth (ft)	Spl Run	Lab Samples	Description				
<div><div>Boring Dia.</div><div>< -- ></div><div><div></div><div></div></div></div>							
50			MW-29BR (cont'd)				
51							
52							
53							
54			53.7-55.2 ft: (Top 1.5 ft) Same as above		5.0		
55			55.2-58.7 ft GRANITE-DIORITE, very hard, fresh, white (60%) and black, coarse grained, jointed,				
56			rough, closely to moderately closely spaced fractures, subvertical to subhorizontal fracture				
57			orientation. RQD=0.80				
58			Four-inch PVC casing installed from 0 to 58 ft bls				
59			58.7-63.7 ft: GRANITE-DIORITE, same as above. At least 4 horizontal to subvertical fractures		5.0		
60			through core. Quartz veins of similar orientation also present.				
61							
62							
63							
64			63.7-68.7 ft: GRANITE-DIORITE, same composition as above, fine grained. A single		5.0		
65			fracture present, may be mechanical.				
66			65.7-68.7 ft: GRANITE-DIORITE, same composition as above, coarse grained. Multiple				
67			subhorizontal fractures which appear to be mechanical. RQD=1.0				
68							
69			68.7-73.7 ft: GRANITE-DIORITE, greater composition of lighter colored minerals (65%),		5.0		
70			moderately close fractures. Two fractures subvertical fractures. RQD=1.0				
71							
72							
73							
74							
75			74.7-79.7 ft: GRANITE-DIORITE, same as above, at least one sub-vertical fracture. RQD=1.0		5.0		



Borehole and Well Construction Log

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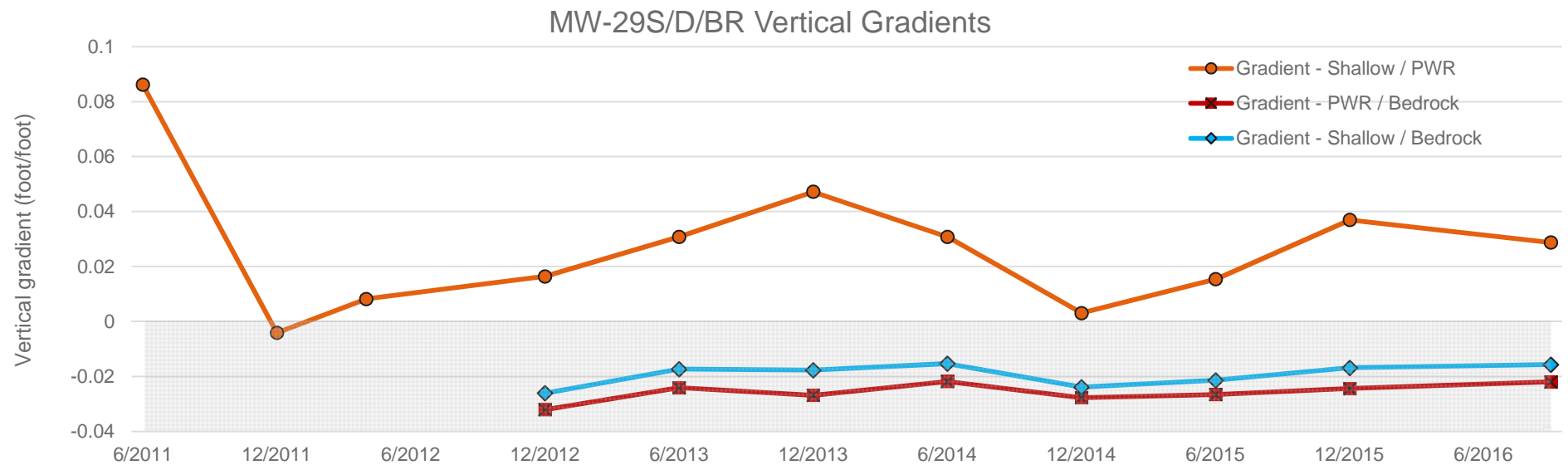
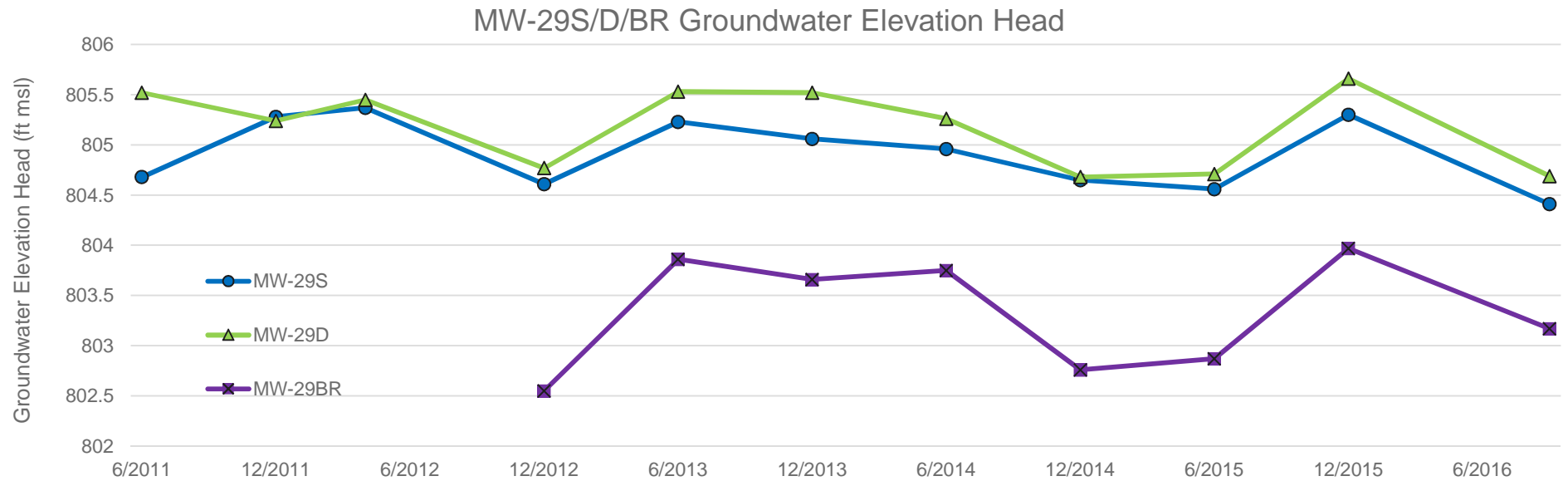
Well ID MW-29BR

Project: Ashland Greensboro

Project #: OH005000.NC05.12308

Well Construction Log	Depth (ft)	Spl Run	Lab Samples	Borehole Log Description	Fl. Rec.	Blow Count	PID (ppm)
<div>Boring Dia. <div>< - - ></div></div> <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	75			MW-29BR (cont'd)			
	76						
	77						
	78						
	79						
	80			79.7-82.3ft: GRANITE-DIOIRITE, same as above, darker minerals approximately 60%, high angle fracture from 79.7 to 80.7 ft. RQD=1.0	2.5		
	81						
	82						
	83			82.3-90.0 ft: Not sampled, advanced with air rotary methods.			
	84						
	85						
	86						
	87						
	88						
	89						
	90			Bottom of boring at 90.0 ft			
	91						
	92						
	93						
	94						
	95						
	96						
	97						
	98						
	99						
	100						

ATTACHMENT B



Arcadis G&M of North Carolina, Inc.
801 Corporate Center Drive,
Suite 300
Raleigh, NC 27607

PROJECT MANAGER:
D. Wilderman

PROJECT NUMBER:
OH010000.NC10

MW-29 Groundwater Elevation
Heads and Vertical Hydraulic
Gradients Over Time
Ashland ,Greensboro, NC

FIGURE
1

ATTACHMENT C

Table A3. Summary of Historical Groundwater Analytical Results (Detects Only), Former Ashland Distribution Facility, Greensboro, NC

Sample Location: Date Sampled:	NCAC 2L Standard	MW-29S 4/11/2011	MW-29S 12/13/2011	MW-29S 5/2/2012	MW-29S 6/18/2013	MW-29S 12/9/2013	MW-29S 6/19/2014	MW-29S 12/17/2014	MW-29S 6/24/2015	MW-29S 12/10/2015
<u>Field Parameters</u>										
Temperature (°C)	NE	14.53	16.48	19.22	22.91	12.65	24.90	14.71	32.15	17.71
pH (standard units)	6.5 - 8.5	4.33	5.55	5.65	5.6	5.72	5.85	5.91	5.85	6.00
Dissolved Oxygen (mg/L)	NE	10.46	0.00	2.40	0.59	2.06	5.01	5.81	2.80	0.23
Specific Conductance (µS/cm)	NE	205	206	220	227	169	884	417	419	362
Oxidation-Reduction Potential (mV)	NE	247.6	-18	138.5	143	-66.9	69.4	58	135.7	58.2
<u>VOCs (USEPA Method 8260B) µg/L</u>										
Acetone	6,000	<25	<25	<25	<25	<25	<25	<10	< 10	< 10
Benzene	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
Carbon Tetrachloride	0.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
Chloroform	70	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
1,1-Dichloroethane	6	2.2	1.2	<1.0	<1.0	1.7	<1.0	1.4	1.5	1.8
1,1-Dichloroethene	350	10	1.6	3.2	2.5	6.6	1.1	4.8	4.6	5.8
cis-1,2-Dichloroethene	70	17	7.6	6.4	6.5	15	2.9	11	11	17
Ethylbenzene	600	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
Methylene Chloride	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	< 5.0
Tetrachloroethene	0.7	72	44	31	80	63 J	20	62	50	72
Toluene	600	<1.0	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	200	<1.0	3.7	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
Trichloroethene	3	28	17	12	13	24	5.2	22	18	29
Vinyl Chloride	0.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0
Xylenes (Total)	500	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	< 1.0	< 1.0
<u>SVOCs (USEPA Method 8270C) µg/L</u>										
1,4-Dioxane	3	7.6	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	<10	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	20	<10	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	6	<10	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	6	<10	NA	NA	NA	NA	NA	NA	NA	NA

Table A3. Summary of Historical Groundwater Analytical Results (Detects Only), Former Ashland Distribution Facility, Greensboro, NC

Sample Location: Date Sampled:	NCAC 2L Standard	MW-29D 4/11/2011	MW-29D 12/13/2011	MW-29D 5/2/2012	MW-29D 6/19/2013	MW-29D 6/19/2014	MW-29D 6/24/2015	MW-29D 9/22/2016
<u>Field Parameters</u>								
Temperature (°C)	NE	15.95	18.56	19.01	28.37	19.49	27.82	24.3
pH (standard units)	6.5 - 8.5	5.62	5.79	5.90	5.80	5.70	5.92	5.72
Dissolved Oxygen (mg/L)	NE	8.07	0.10	0.35	1.53	6.02	2.68	0.0
Specific Conductance (µS/cm)	NE	223	217	205	183	184	259	166
Oxidation-Reduction Potential (mV)	NE	188.7	202	82.7	156	77.5	123.4	185
<u>VOCs (USEPA Method 8260B) µg/L</u>								
Acetone	6,000	<25	<50	<50	<50	<130	< 50	<50
Benzene	1	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
Carbon Tetrachloride	0.3	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
Chloroform	70	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
1,2-Dichlorobenzene	20	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
1,4-Dichlorobenzene	6	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
1,1-Dichloroethane	6	5.2	5.8	<2.0	5.2	6.6	6.7	8.0
1,2-Dichloroethane	0.4	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
1,1-Dichloroethene	350	27	24	43	17	31	35	39
cis-1,2-Dichloroethene	70	42	42	59	48	61	65	81
1,2-Dichloropropane	0.6	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
Ethylbenzene	600	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
Methylene Chloride	5	<5.0	<10	<10	<10	<25	< 25	<25
Tetrachloroethene	0.7	160	220	240	220	290	290	390
Toluene	600	<1.0	6.1	<2.0	<2.0	<5.0	< 5.0	<5.0
1,1,1-Trichloroethane	200	<1.0	16	<2.0	<2.0	<5.0	< 5.0	<5.0
Trichloroethene	3	59	100	110	100	100	110	160
Vinyl Chloride	0.03	<1.0	<2.0	<2.0	<2.0	<5.0	< 5.0	<5.0
Xylenes (Total)	500	<2.0	<4.0	<4.0	<4.0	<10	< 5.0	<10
<u>SVOCs (USEPA Method 8270C) µg/L</u>								
1,4-Dioxane	3	13	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	<10	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	20	<10	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	6	<10	NA	NA	NA	NA	NA	NA
Naphthalene	6	<10	NA	NA	NA	NA	NA	NA

Notes are presented on the last page of the table.

Table A3. Summary of Historical Groundwater Analytical Results (Detects Only), Former Ashland Distribution Facility, Greensboro, NC

Sample Location: Date Sampled:	NCAC 2L Standard	MW-29BR* 6/29/2012	MW-29BR 6/19/2013
Field Parameters			
Temperature (°C)	NE	NM	19.44
pH (standard units)	6.5 - 8.5	NM	6.36
Dissolved Oxygen (mg/L)	NE	NM	0.00
Specific Conductance (µS/cm)	NE	NM	346
Oxidation-Reduction Potential (mV)	NE	NM	130
VOCs (USEPA Method 8260B) µg/L			
Acetone	6,000	<130	<130
Carbon Tetrachloride	0.3	<5.0	<5.0
Chloroform	70	<5.0	<5.0
1,2-Dichlorobenzene	20	<5.0	<5.0
1,1-Dichloroethane	6	15	11
1,2-Dichloroethane	0.4	<5.0	<5.0
1,1-Dichloroethene	350	110	100
cis-1,2-Dichloroethene	70	130	130
1,2-Dichloropropane	0.6	<5.0	<5.0
Ethylbenzene	600	<5.0	<5.0
Methylene Chloride	5	<25	<25
Tetrachloroethene	0.7	290	360
Toluene	600	<5.0	<5.0
1,1,1-Trichloroethane	200	<5.0	<5.0
Trichloroethene	3	170	190
Vinyl Chloride	0.03	7.7	5.2
Xylenes (Total)	500	<10	<10
SVOCs (USEPA Method 8270C) µg/L			
1,4-Dioxane	3	NA	NA
1,2,4-Trichlorobenzene	70	NA	NA
1,2-Dichlorobenzene	20	NA	NA
1,4-Dichlorobenzene	6	NA	NA
3-Methylphenol/4-Methylphenol	400/40	NA	NA
Dimethylphthalate	NE	NA	NA
Naphthalene	6	NA	NA
Phenol	30	NA	NA

Notes:

* Groundwater sample was collected from a depth interval of 79 to 87 ft bgs in the open boring prior to well installation
Additional notes are presented on the last page of the table.